CLAIMS

We claim:

1.   A method to produce a diesel fuel blend having a pre-determined flash-point and a pre-determined increase in cetane number, comprising the steps of:

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    a)   selecting a stock diesel fuel with a flash-point and a cetane number,

    b)   establishing the pre-determined flash-point and the pre-determined increase in cetane number of the diesel fuel blend to be produced;

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    c)   adding an amount of a first oxygenate with a flash-point less than the flash-point of said stock diesel fuel and a cetane number equal to or greater than the cetane number of said stock diesel fuel, said amount being sufficient to adjust the flash-point of the diesel fuel blend to the pre-
15   determined flash-point; and

    d)   adding an amount of a second oxygenate with a flash-point equal to or greater than the flash-point of said stock diesel fuel and a cetane number greater than the cetane number of said stock diesel fuel, said amount
20   being sufficient to achieve the pre-determined increase in cetane number

wherein the first oxygenate and the second oxygenate are not the same oxygenate.

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2.   The method of claim 1 wherein the first oxygenate is selected from the group consisting of ethers, polyethers, acetals, long chain linear alcohols and esters of fatty acids.

30   3.   The method of claim 1 wherein the second oxygenate is selected from the group consisting of ethers, polyethers, acetals, long chain linear alcohols and esters of fatty acids.

4.   The method of claim 1 wherein the first oxygenate is selected from monoglyme, diethylether and diisoproplyether.

5.   The method of claim 1 wherein the second oxygenate is selected from diglyme, triglyme and dipentylether.

6.   The method of claim 1 wherein the said first additive is monoglyme and said second additive is diglyme.

7.   The method according to claim 1 wherein the amount of the first oxygenate to adjust the flash point of the stock diesel fuel to the pre-determined flash-point of the diesel fuel blend is determined by the equation

$$T_1/T_2 = 1 + T_1 R \ln[x] / \Delta H$$

wherein T_1 is the flash-point temperature of the first oxygenate,
    T_2 is the pre-determined flash-point temperature of the diesel fuel blend ,
    R is the ideal gas constant,
    ΔH is the enthalpy of vaporization of the first oxygenate and
    [x] is the mole fraction of the first oxygenate in the diesel fuel blend.

8.   The method of claim 1 wherein the amount of the first oxygenate to be added is obtained from a calibration curve established by measuring the flash-point of mixtures of the stock diesel fuel and the first oxygenate.

9.   The method of claim 1 wherein the amount of the second oxygenate to be added is obtained from a calibration curve established by measuring the cetane number of mixtures of the stock diesel fuel and the second oxygenate.